



# NEYER, TISEO & HINDO, LTD.

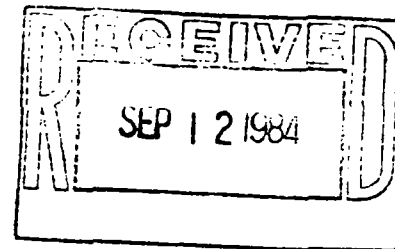
CONSULTING ENGINEERS

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September 10, 1984  
Project No. 84272 OC



B & V Construction Company  
25301 Novi Road  
Novi, Michigan 48050

ATTN: Mr. Donald J. Treder

RE: Clay Cap Evaluation  
BASF - Wyandotte Landfill  
Riverview, Michigan



Dear Mr. Treder:

This letter presents the results of evaluation tests on ~~the~~ the silty clay material being used as a clay cap for the above referenced project. These results have been verbally relayed to your office and other concerned parties.

Bag 3 material was delivered to our office and was reportedly obtained between Elevations 586 and 595 from the northwestern part of the Wayne County Sewage Abatement site at Goddard and Moran in Taylor, Michigan. The material consists of brown and gray silty clay with a trace of sand.

Test results on Bag 3 material consisted of Modified Proctor, sieve and hydrometer analysis, Atterberg limits and permeability. The results of the proctor, sieve analysis and Atterberg limits are presented on the attached Figures 1, 2 and 3. These results indicate that Bag 3 material has a "CL" designation according to the Unified Classification System, and is essentially the same material as Bag 2 which has been previously approved for use as a clay cap.

Three permeability tests were performed on samples of the silty clay that were prepared and compacted in brass liners (3-inch long and 1-3/8-inch in diameter). The soil was compacted to a density of approximately 90 percent of the Modified Proctor value at different moisture contents. The permeability test results are as follows:

Liner No.	Remolded Density (pcf)	Percent Compaction*	Percent Moisture	Coefficient of Permeability (cm/sec)
1	104.5	90.3	14.0	$3.6 \times 10^{-8}$
2	104.2	90.1	16.2	$2.5 \times 10^{-8}$
3	104.2	90.1	20.8	$2.4 \times 10^{-8}$

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\*Based on a maximum Modified Proctor density value of 115.7 pcf at an optimum content of 15.9 percent.

The results of the evaluation tests indicate that Bag 3 material has a permeability coefficient of less than  $1 \times 10^{-7}$  cm/sec, and is therefore considered suitable for use as a clay cap.

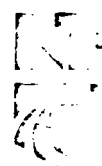
If you have any questions about this letter or the attached data, please call.

Very truly yours,

MEYER, TISEO & HINDO, LTD.

  
D. Nona, P.E.

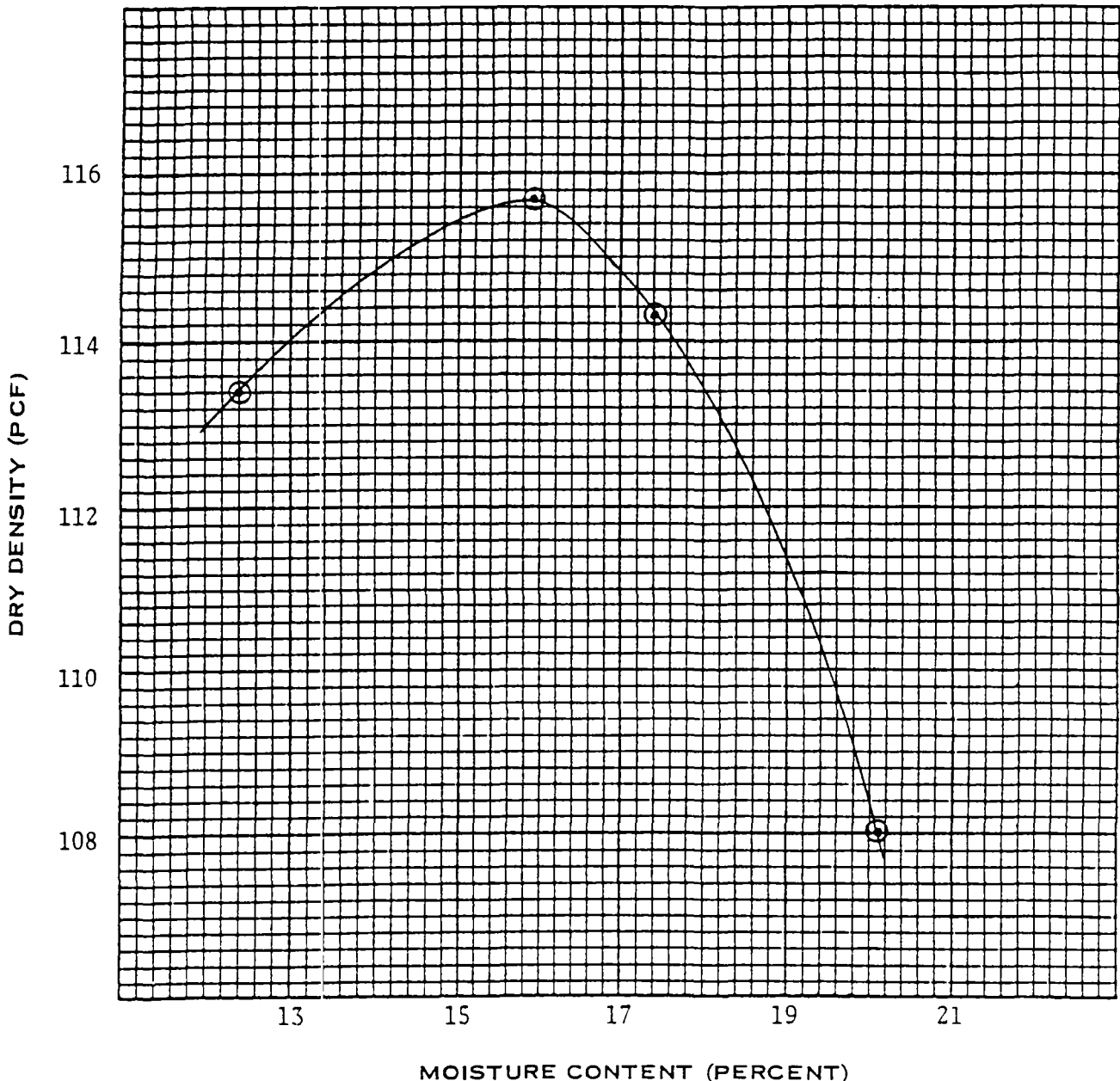
DN/aln  
Attachments

 MEYER, TISEO & HINDO, LTD.

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MOISTURE - DENSITY RELATIONS

PROJECT No. 84272 PROJECT: BASF Wyandotte Company - Riverview, Michigan  
Sample Source Wayne County Sewage Abatement Site - Taylor, Michigan  
BAG SAMPLE No. #3 SAMPLE DEPTH between Elev. 586 & 595  
SAMPLE DESCRIPTION Brown and grey silty clay, trace sand  
METHOD OF COMPACTION ASTM 1557 Method A  
MOLD: No. 1 DIA. 4 IN., HT. 4.5 IN., VOLUME 0.333 CU. FT., WT. 9.32 LB.  
TESTED BY: P.S. CHECKED BY: E.W. DATE: 8/11/84



MAXIMUM DRY DENSITY 115.7 PCF

OPTIMUM MOISTURE CONTENT 15.9 %

REMARKS: \_\_\_\_\_

Figure 1

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GRAIN SIZE DISTRIBUTION CURVE

PROJECT NO. 84272 LAB SAMPLE NO. 50 SOURCE Wyandotte BASF, Riverview, Michigan  
 Sample Location Wayne County Sewage Abatement Site - Taylor, Michigan FOR  
 BORING NO. \_\_\_\_\_ FIELD SAMPLE NO. Bag 3 SAMPLE DEPTH \_\_\_\_\_ SAMPLE ELEV. between Elev. 586 & 595  
 SAMPLE DESCRIPTION Brown and Gray Silty Clay.  
 DATE SAMPLED \_\_\_\_\_ BY \_\_\_\_\_ DATE TESTED 8/11/84 BY SY CHECKED BY EW

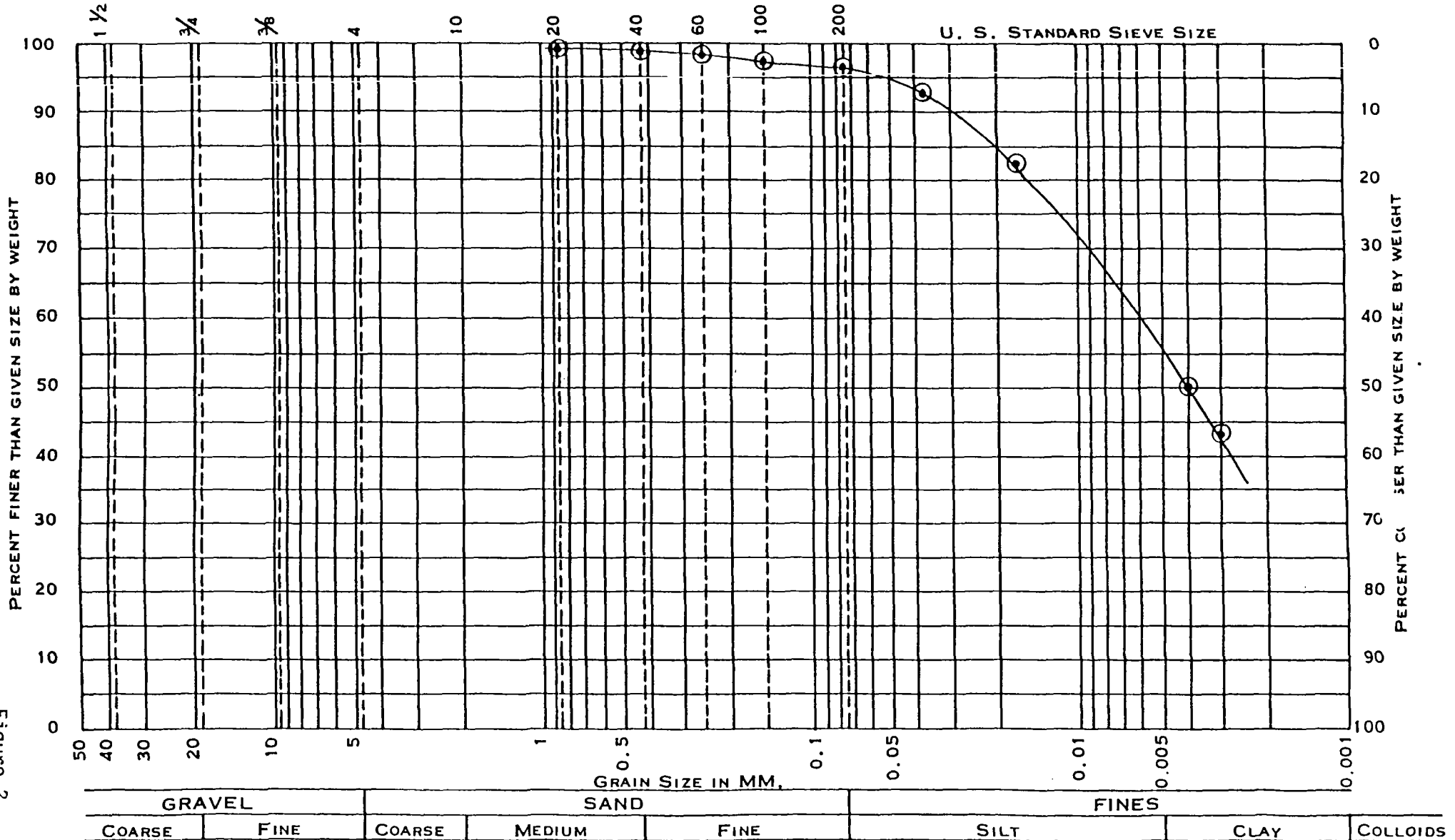


Figure 2

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SOIL CONSTANTS

LAB. SAMPLE NO. Bag 3 PROJECT NO. 84272 FOR Wyandotte BASF Landfill, Riverview, Michigan  
Sample Source Wayne County Sewage Abatement Site - Taylor, Michigan  
BORING NO. \_\_\_\_\_ FIELD SAMPLE NO. Bag 3 SAMPLE DEPTH \_\_\_\_\_ SAMPLE ELEV. between Elev.  
SAMPLE DESCRIPTION Brown and Gray Silty Clay, Trace of Sand. 586 & 595

TESTED BY: SY CHECKED BY: EW DATE 8/16/84

**MOISTURE CONTENT**

SPECIMEN DESIGNATION									
TARE NUMBER									
WET WEIGHT + TARE (GR)									
DRY WEIGHT + TARE (GR)									
WEIGHT OF MOISTURE (GR)									
WEIGHT OF TARE (GR)									
DRY WEIGHT (GR)									
MOISTURE CONTENT (%)									

**LIQUID AND PLASTIC LIMITS**

PURPOSE OF TEST									
NUMBER OF BLOWS	31	24							
TARE NUMBER	A-41	A-16	A-32						
WET WEIGHT + TARE (GR)	28.33	29.36	24.46						
WEIGHT + TARE (GR)	23.30	23.62	21.82						
WEIGHT OF MOISTURE (GR)									
WEIGHT OF TARE (GR)	11.57	10.76	10.85						
DRY WEIGHT (GR)									
MOISTURE CONTENT (%)	42.9	44.6	24.1						

**SPECIFIC GRAVITY  $G = G_0 W_0 \div (W_0 - W_1 + W_2)$**

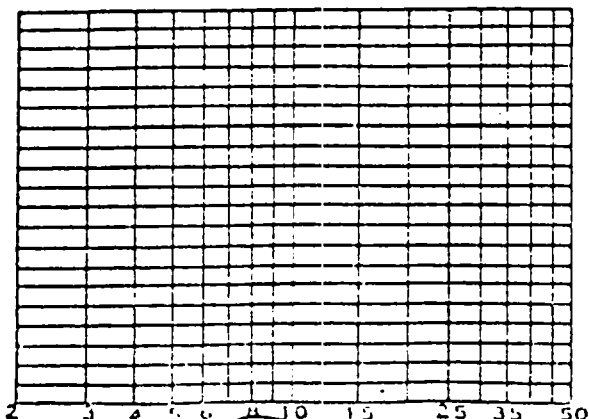
SPECIMEN DESIGNATION		
PYCNOMETER NUMBER		
WT. PYC. SOIL, WATER (W <sub>1</sub> ) (GR)		
TEMPERATURE (DEGREES CENT.)		
WT. PYC. WATER (W <sub>2</sub> ) (GR)		
TARE NUMBER		
DRY WEIGHT + TARE (GR)		
WEIGHT OF TARE (GR)		
DRY WEIGHT (W <sub>0</sub> ) (GR)		
SPECIFIC GRAVITY, WATER (G <sub>0</sub> )		
SPECIFIC GRAVITY, SOIL (G)		

**UNIT DENSITIES AND VOLUMETRIC ANALYSIS**

SPECIMEN DESIGNATION				
WET WEIGHT + TARE (GR)				
WEIGHT OF TARE (GR)				
WET WEIGHT (GR)				
MOISTURE CONTENT (%)				
DRY WEIGHT (GR)				
SAMPLE LENGTH (IN)				
SAMPLE DIAMETER (IN)				
SAMPLE VOLUME (CU IN)				
SAMPLE VOLUME (CC)				
WET DENSITY (GR/CC)				
DRY DENSITY (GR/CC)				
WET DENSITY (PCF)				
DRY DENSITY (PCF)				
WEIGHT OF WATER (PCF)				
SPECIFIC GRAVITY				
VOLUME OF SOLIDS (%)				
VOLUME OF LIQUIDS (%)				
VOLUME OF AIR (%)				
SATURATION (%)				

**LIQUID LIMIT FLOW CURVE**

MOISTURE  
CONTENT (%)



LIQUID LIMIT (LL)	44
PLASTIC LIMIT (PL)	24
PLASTICITY INDEX (LL - PL)	20

Figure 3